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A new species of the genus *Siambathynella* Camacho, Watiroyram & Brancelj, 2011 (Crustacea, Bathynellacea, Parabathynellidae) from a Thai cave

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Abstract

Siambathynella janineana **sp. nov.** (family Parabathynellidae) discovered in Thailand is herein described. The new species displays an exclusive character: a distinctive organ on the antennule of males. It also displays a unique combination of morphological characters, including a seven-segmented antennule and antenna, sexual dimorphism of the antennule, a one-segmented exopod on thoracopod I and a two-segmented one on thoracopods II to VII, a male thoracopod VIII without basipodial setae and with a trapezoidal outer lobe, a female thoracopod VIII with two denticles at the base of two setae, pleopods absent, a sympod of the uropod with an inhomonomous row of spines and an uropod endopod with a spinous distal process and a very large distal spine covered with setules.
This is the fifth record of Bathynellacea (family Parabathynellidae) found in caves in Thailand.

Keywords

cave, groundwater, Parabathynellidae, *Siambathynella*, Thailand

Introduction

The family Parabathynellidae is currently comprised of 45 genera and 220 species worldwide (210 species, Camacho et al. 2021a, b, 2022). Of these known species, around 77 belonging to 16 genera occur in Asia (Camacho 2019). To date, most

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of the Asian species that have been described are from South Korea (27 species) and India (23 species), with very few species known from Thailand and nearby countries. Only two genera (and four species) belonging to the Parabathynellidae have been described from four caves in Thailand: *Paraeobathynella* Camacho, 2005 (three species) and *Siambathynella* Camacho, Watiroyram & Brancelj, 2011 (one species). This last genus is characterized by the presence of a male antennal organ, an uncommon trait in Parabathynellidae. Indeed, only six of the family's genera have species that display this type of sexual dimorphism (Camacho 2019). Three of the genera with species characterized by a male antennal organ, though with varied morphology, are found in Asia: *Siambathynella* (*Siambathynella laorsriae* Camacho, Watiroyram & Brancelj, 2011) and some Indian species of *Chilibathynella* Schminke, 1973 (*C. kotumsarensis* Ranga Reddy, 2006) and *Atopobathynella* Schminke, 1973 (*A. operculata* Ranga Reddy, Drewes & Schminke, 2008; *A. paraoperculata* Ranga Reddy & Totakura, 2015; *A. indica* Bandari, Shaik, Ranga Reddy & Totakura, 2017; *A. nelloreensis* Bandari, Shaik and Ranga Reddy & Totakura, 2017 and *A. inopinata* Bandari, Shaik, Ranga Reddy & Totakura, 2017). *Hexabathynella* Schminke, 1972, a cosmopolitan genus of Bathynellacea, contains 23 species whose males present a highly complex antennal organ not found in females (Cho and Schminke 2006); however, none of these species occur in Asia. *Siambathynella* is the only genus found in Thailand that shows sexual dimorphism in article two of the antennule. Here, we describe the morphology a new species of *Siambathynella*, *Siambathynella janineana* sp. nov., the second species of the genus occurring in Thai caves. The new species undoubtedly belongs to *Siambathynella* as it shows a combination of morphological features representative of the genus and some exclusive characters.

Siambathynella laorsriae Camacho, Watiroyram & Brancelj, 2011 was found in a cave in the northern of Thailand (Nam Nao National Park, Phetchabun) as the new species described here (Chiang Dao District). The other genus present in Thailandia, *Paraeobathynella*, is represented by the species, *P. ratensis* Camacho & Watiroyram, 2018, *P. siamensis* Camacho & Watiroyram, 2018 and *P. hanjavanitiana* Camacho & Watiroyram, 2018, that live in three tourist cave located in the Nakhon Si Thammarat mountain range (Thung Song District) in the southern of Thailand.

Material and methods

Study area and groundwater sampling methods

In 1985, a French-led expedition comprised of the biologists and speleologists A. Bedos, L. Deharveng, J. Gibert, B. Lebreton and P. Leclerc carried out explorations and sampling of caves in Thailand and Indonesia (Zeitoun et al. 1985). One of the explored cavities, Tham Chiang Dao, Amphoe Chiang Dao, Chiang Mai Province, Chiang Dao District, Northern Thailand (coordinates: 19°23'38"44°N, 98°55'41"00°E – Z 455 m), is the type locality of the new species. This cave is located in one of the largest limestone regions in the world, which includes most of southwestern China and a part

of northern Vietnam, extending through the Golden Triangle, i.e., the meeting point of the borders of Laos, Thailand and Burma (Myanmar). The region is characterized by a type of humid tropical karst with a long pre-quaternary evolution: the morphology is that of an "inselberg" karst (Gibert 1987). This type of karst develops in the primary Permian limestones of the Ratburi formations. Most of the cave is fossil and opens at the level of the alluvial plain by an exsurgence on carboniferous grounds comprised of cherts, sandstones, schists and conglomerates (Gibert 1987). The specimens used for the description of *Siambathynella janineana* sp. nov. (14 males, 21 females and one juvenile) were sampled from a medium-sized muddy pool (mainly, colloidal silt) located in the upper fossil gallery of the cave. The sampling was carried out by removing the sediment from the bottom of the pool and using a hand-held plankton net with a 0.112-mm mesh to filter specimens from the murky water. The collected specimens were preserved in 70% ethanol. Given this preservation method and the length of time since collection, we were unable to extract DNA from the specimens for complementary molecular studies.

Morphological study

Of the 36 specimens sampled,16 (8 males and 8 females) were processed for the detailed morphological study. Four specimens (2 males, 2 females) were mounted *in toto* and 12 were completely dissected (i.e., all body appendages were separated) and preserved on permanent special metal slides (with glycerine-gelatin stained with methylene blue and paraffin as the mounting medium) as previously described by Perina and Camacho 2016. Anatomical examinations were performed using a Zeiss interference microscope fitted with an oil immersion lens (100×) and a drawing tube. Material were deposited in the Arthropod Collection held at the Museo Nacional de Ciencias Naturales (MNCN) in Madrid, Spain. The terminology adopted was as in Serban (1972) and Schminke (1973).

Abbreviations used in the text and figures

Morphology

AI = antennule; **AII** = antenna; **Bsp.**= basipod; **D.Lb.**= dentate lobe; **Endp.**= endopod; **Exp.**= exopod; **I.Lb.**= inner lobe; **Lb** = labrum; **Md** = mandible; **MxI** = maxillule; **MxII** = maxilla; **O.Lb.**= outer lobe; **Sgt** = article; **ThI–VIII** = Thoracopods I–VIII; **Symp** = Sympod; **Urp** = uropod.

Acronyms

MNCN	Museo Nacional de Ciencias Naturales de Madrid, (Spain).
CSIC	Consejo Superior de Investigaciones Científicas (Spain).
ARTP/MNCN	MNCN Arthropod Collection.

Results

Systematic account

Order Bathynellacea Chappuis, 1915
Family PARABATHYNELLIDAE Noodt, 1965

Genus *Siambathynella* Camacho, Watiroyram & Brancelj, 2011

Amended genus diagnosis. after Camacho, Watiroyram and Brancelj, 2011.

Antennule seven-segmented, without aesthetascs on the fifth article and with subterminal aesthetascs on the last article, sexually dimorphic, with a male antennal organ on the second article of the antennule. Antenna seven-segmented, first, second and fifth articles without setae. Mandible with expanded distal claw on *pars molaris*. Maxilla with four articles. Exopod of thoracopods II to VII each two-segmented, that of ThI one-segmented; basipod of thoracopods I to VII with one smooth seta; epipod of ThI absent. Male thoracopod VIII: almost square, with small endopod integrated into basipod and one or two smooth long setae; inner lobe incorporated into basal region, slightly shorter than dentate lobe; basipod very large, almost square and with a row of small denticles on the distal part, proximal side with two lobes, one of which is curved inwards and almost completely covers the exopod, without setae. Female thoracopod VIII: with two long setae. Pleopods absent. Ventro-lateral seta of pleotelson located adjacent to the insertion of the furca. Inhomonomous uropod sympod with a row of spines occupying the distal half; endopod with a spinous projection on the distal outer corner and with one thick spine covered with setules.

Type species. *Siambathynella laorsriae* Camacho, Watiroyram & Brancelj, 2011.

Siambathynella janineana sp. nov.

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Figs 1–4

Type locality. Tham Chiang Dao Cave (19°23'38"44°N, 98°55'41"00°E – Z 455 m), Thailand. Collected by Philippe Leclerc (17/07/1985).

Type material. ***Holotype*** male (MNCN 20.04/20552), allotype female (MNCN 20.04/20553) and type series comprised of seven males (MNCN 20.04/20554 to MNCN 20.04/20560) and seven females (MNCN 20.04/20561 to MNCN 20.04/20567), each on individual slides.

Description. ***Body*** (Fig. 1). Total length of holotype 1.25 mm; allotype 1.5 mm; male length, 1.1–1.6 mm; female length, 1.0–1.8 mm. Body elongated, segments slightly widen towards posterior margin; head about as long as broad. Pleotelson with one plumose ventro-lateral seta on each side. All drawings are of the (male) holotype except for the female ThVIII and second article of the antennule, which were drawn from the female allotype.

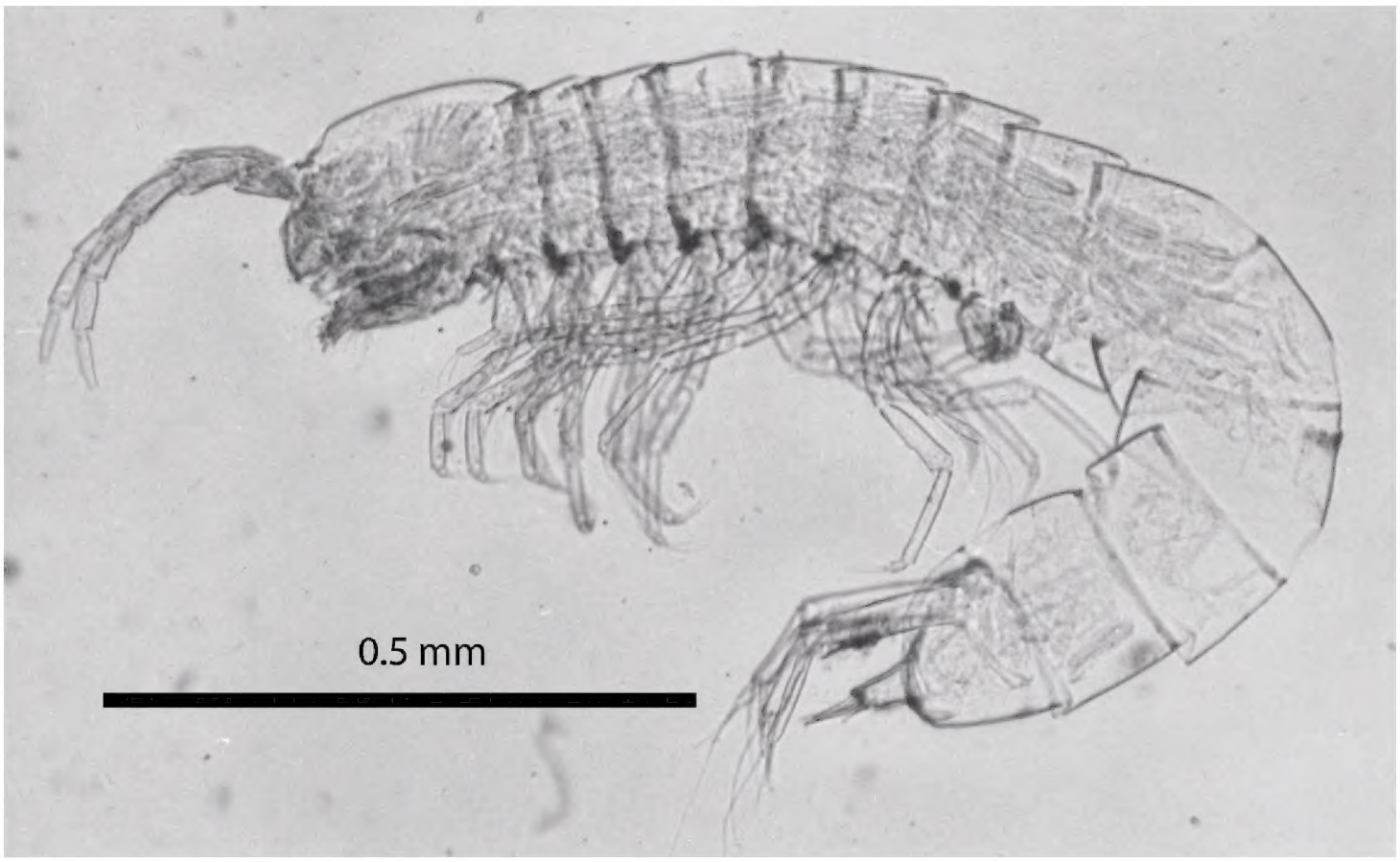

Figure 1. *Siambathynella janineana* sp. nov. Habitus male.

Antennule (Fig. 2A). Seven-segmented; first three articles slightly longer than the other four; first two articles similar in length and the third is the longest; sexual dimorphism manifested by the presence of a well-developed antennal organ on the inner distal margin of the second article in males (Fig. 2A), organ represented as a protrusion with a smooth, moderately long seta in its middle lateral area. On the female antennule, only a short seta is present in the homologous position as the male antennal organ (Fig. 2C); inner flagellum almost square; fourth article slightly longer than the fifth, with two aesthetascs, which is the smallest of all the articles at half the length of the seventh, which is slightly longer than the penultimate articles; sixth and seventh articles each with three aesthetascs, which are placed sub-terminally on the last article; setation pattern as shown in Fig. 2A.

Antenna (Fig. 2B). Seven-segmented; approximately 70% the length of AI; first three articles small, all similar in size to the fifth and about 50% the length of the fourth article, which is similar in size to the last two articles; distal article with four setae, one of which is plumose. Setal formula: 0/0/1+0/1+1/0+2/4(1).

Labrum (Fig. 2D). Almost flat with eight main teeth, with the two central teeth that are slightly different from the others, more rounded, plus two lateral teeth on each side. Ventral surface ornamented with rows of fine spinules.

Mandible (Fig. 2E). *Pars incisiva* with four teeth and a well-developed triangular tooth on the ventral edge; *pars molaris* with five claws, one strongly modified distal claw that is slightly separated from the rest, with small denticles, and four claws (the two proximal ones are joint) with fine long setules; mandibular palp one-segmented, with a distal seta that does not exceed the length of the *pars incisiva*.

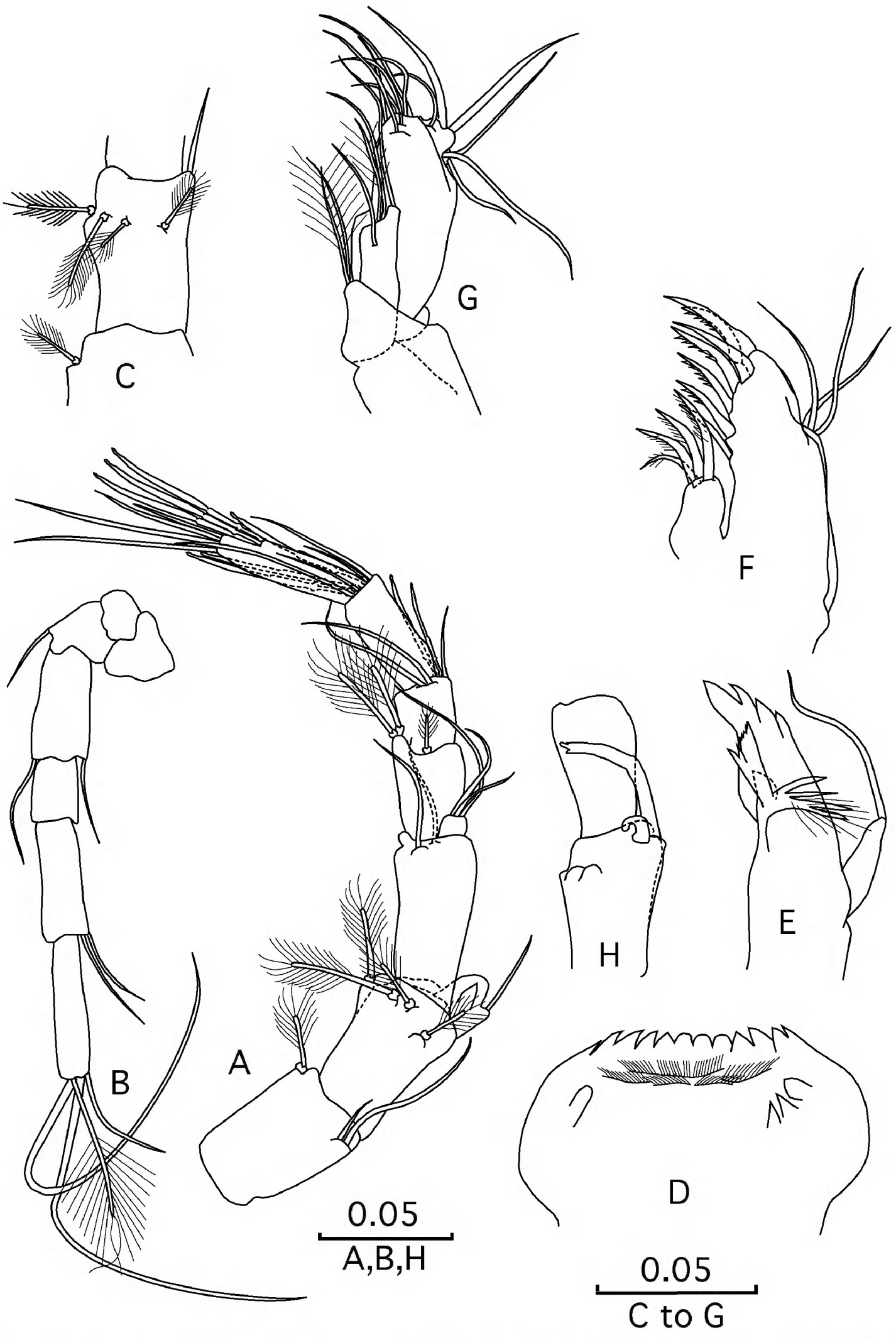

Figure 2. *Siambathynella janineana* sp. nov. All drawings of the male holotype except in **C**. **A** AI **B** AII **C** second article of AI of female allotype **D** Lb **E** Md **F** MxI **G** MxII **H** antennal organ on second article of AI in *Siambathynella laorsriae* Camacho, Watiroyram & Brancelj, 2011. Scale bars in mm.

Maxillule (Fig. 2F). Proximal endite with four long serrulate claws; distal endite with seven claws, the basal one very thin, the two distal ones smooth and the other five with denticles, and with three sub-terminal smooth setae on the outer distal margin.

Maxilla (Fig. 2G). Four-segmented, first two articles with an elongated endite, with two and four setae, respectively, one setae on each endite plumose; third article rectangular with one strong claw and eight smooth setae; fourth article reduced with five setae. Setal formula: 2, 3+1, 9, 5.

Thoracopods **I–VII** (Fig. 3A–G). Well developed, gradually increasing in length from ThI to ThV, last two thoracopods similar in length; ThI without epipod, ThII–VII with large epipod, each about the same length as the corresponding basipod; basipod of ThI–VII with one smooth seta on inner distal corner. Exopod of ThI one-segmented, two-segmented in ThII–VII; exopod longer than first two endopod articles in ThII–VI and equal in length in ThVII; two barbed setae on each exopodal article and with one group of strong ctenidia at the base of the inner setae. Endopod four-segmented; first article short, second and third long and similar in length, both with a cluster of strong spinules along the outer margin; fourth article reduced, with two smooth, strong claws of similar length and one seta; pair of smooth inner setae on first article present only on ThI; inner setae on article two always barbed; outer small seta on third article of ThI–VII smooth; outer distal setae on second article of all Ths plumose. Setal formula of endopod as follows:

Thoracopod I	2+0/2+1/1+1/3(1)
Thoracopod II	1+0/2+1/1+1/3(1)
Thoracopod III and IV	0+0/2+1/1+1/3(1)
Thoracopod V to VII	0+0/1+1/1+1/3(1)

Thoracopod **VIII** (Fig. 4A, B). Almost square; basal region of the penial complex with three lobes: inner lobe (I.Lb.), outer lobe (O.Lb.) and dentate lobe (D.Lb.); rectangular inner lobe completely integrated into basal region, a little shorter than dentate lobe; trapezoidal outer lobe as dentate lobe; endopod (Endp.) integrated on basipod, with one long smooth seta; reduced exopod, with two spinules; basipod very large, square, slightly recurved caudally, with a distal row of small denticles, with two lobes on the frontal side, one of which is recurved inwards (crest-like protuberance), without setae. The ThVIII of the type species, *S. laorsriae*, is shown for comparison (Fig. 4C).

Thoracopod **VIII female** (Fig. 4D). One-segmented with two long smooth setae and two small denticles at the base.

First pleopods. Absent.

Uropod (Fig. 4E). Sympod five times as long as wide and twice as long as endopod, with nine barbed spines about equal in length except the distal-most, which is twice as long as the others, occupying the distal half; exopod 30% longer than endopod, with four barbed setae, two terminally and unequal in length; distal outer corner of endopod forming a spinose process, with two row of setules and one strong spine that is 20% longer than the endopod, with setules, one plumose seta near the base and two small barbed terminal setae of different lengths.

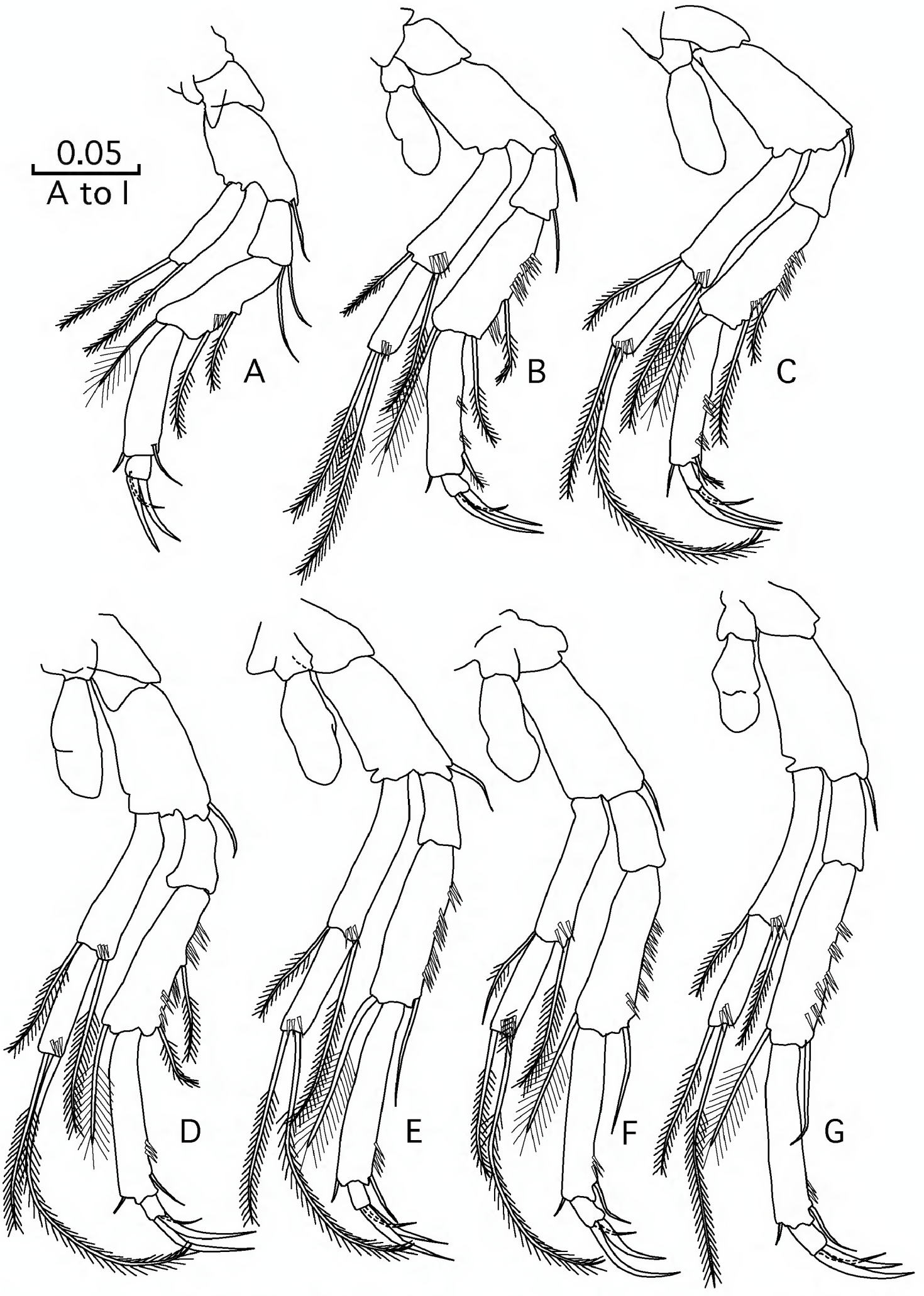

Figure 3. Thoracopods I to VII of *Siambathynella janineana* sp. nov. Male holotype **A** ThI **B** ThII **C** ThIII **D** ThIV **E** ThV **F** ThVI **G** ThVII. Scale bars in mm.

Pleotelson (Fig. 4F). With one small, plumose ventro-lateral seta on each side close to the insertion of the furca. Anal operculum slightly concave.

Furca (Fig. 4F). Rectangular, with three barbed spines, outer two spines twice as long as the innermost one; two equally long dorsal plumose setae; lateral furcal organ "cork"-like.

Variability. The number of spines on the uropod sympod varies between nine and 12, with the larger specimens showing a higher number of spines. Variation is also observed in the setal formula of the endopod of the thoracopods: ThI, 2+0/2–3+1/1–2+1/3(1); ThII, 1+0/2–3+1/1–2+1/3(1); ThIII, 0–1+0/2–3+1/1–2+1/3(1); ThIV-V, 0–1+0/2+1/1+1/3(1); ThVI, 0–1+0/1–2+1/1+1/3(1) and ThVII, 0+0/1–2+1/1+1/3(1).

Remarks and discussion. *Siambathynella janineana* sp. nov. is morphologically similar to the type species *S. laorsriae* in generic features (Camacho et al. 2011) such as the number of articles on AI and AII, presence of a male antennal organ on the second article of AI, number of exopod articles on the thoracopod, basipod of male ThVIII with teeth and without setae, the presence of a large endopodal spine on the uropod sympod. The two species are also similar in size, ranging between 1 and 1.8 mm, with females being larger than males in both species. However, both species can be easily distinguished by the antennal organ and the morphology of the lobes on ThVIII in both males and females. The other differences are numerous but more subtle, making them potentially more difficult to discern; however, considered altogether, they reveal two distinct species. In general, these differences relate to relative proportions among articles, specific patterns of setation and relative sizes of setae and spines on AI and AII, mouthparts and other appendages such as the thoracopods, uropod and furca.

The new species (*S. janineana*) differs from the type species (*S. laorsriae*) in the following characteristics: 1) the antennal organ of *S. janineana* is simple, consisting of an expanded area, or protrusion, with one smooth seta; by contrast, *S. laorsriae* has two "curious structures", one resembling a miniature elephant trunk and the other small, half-ring shaped (see Fig. 2H); 2) articles three and seven of the AI of the new species are larger than the rest of the articles, and the fifth is the smallest, whereas in the type species, the first three and the last two AI articles are similarly sized, as are the fourth and fifth, which are the smallest; 3) differences in setation pattern in terms of setal number and size of some AI articles; also, the new species has two aesthetes on the fifth article, which are absent in the type species; 4) AII is 30% shorter than AI in the new species and 40% shorter in the type species; 5) the new species has fewer teeth on the labrum (12 vs 14 in the type species); 6) the distal claw of the *pars molaris* of the Md is slightly modified and separated from the rest of claws and expanded in the new species; the type species has the typical parabathynellida morphology usual morphology; 7) the most basal claw of the distal endite of MxI is very thin in the new species; 8) the exopod is longer than the endopod in ThII to ThV, but of equal length in ThVI and ThVII in the new species; in the type species, the exopod and endopod are similar in length in ThII, ThVI and ThVII, but in ThIII to ThV, the exopod is longer than the endopod, and in ThI of both species, the exopod is shorter than the endopod; 9) the fourth article of the endopod in ThII to ThVII is rectangular; it is only square in ThI in the new species and in all Ths of the type

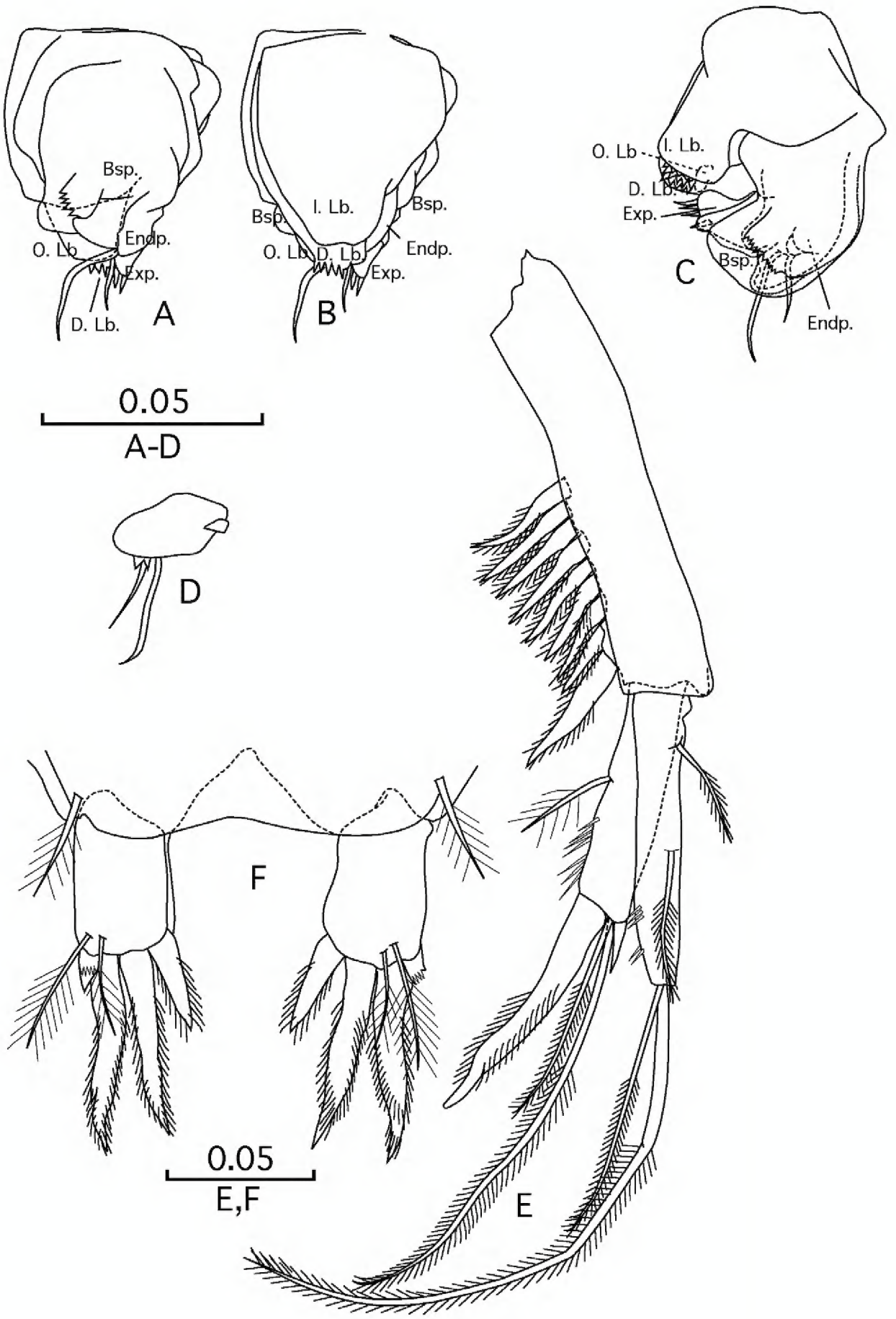

Figure 4. Thoracopod VIII of *Siambathynella janineana* sp. nov. Male holotype except in **C, D**. **A** latero-external view **B** latero-internal view **C** ThVIII of a male *Siambathynella laorsriae* Camacho, Watiroyram & Brancelj, 2011, latero-internal view **D** ThVIII of the female allotype **E** uropod, dorsal view **F** furcal ramus, dorsal view, and pleotelson. Scale bars in mm.

species; 10) two external setae are present on the second article of the endopod of ThI to ThV, and one seta on the rest of Ths, in the new species; in the type species, only ThI and II present two setae, while the rest only have one seta; 11) the presence of an external seta on the third article of the endopod of all Ths in the new species, which is only present on ThI of the type species; 12) the outer seta of the first article of the exopod is as long as the second article in all Ths of the new species, while it is always shorter than the second article in the type species; 13) the outer seta of the second article of the exopod is long, about half the length of the internal seta in ThII to VII in the new species; it is short, about one-third the length of the internal seta, in the type species; 14) the epipod is smaller in the new species; 15) female ThVIII has two denticles in the new species that are not present in the type species; 16) male ThVIII has a small exopod in the new species, and a large recurved one in the type species; 17) the outer lobe of the male ThVII is large, trapezoidal and well individualized in the new species, while it is reduced and fused to the basipod in the type species; 18) the uropod sympod is five times as long as wide; in *S. laorsriae*, it is only three times as long as wide; 19) the uropod exopod is 30% longer than the endopod in the new species; the two structures are similar in size in the type species; 20) the strong distal spine of the uropod endopod is 20% longer than the endopod and has with two longitudinal rows of setules in the new species, while in the type species, the spine and endopod are of equal length and the spine has an oblique row of setules; 21) the inner distal setae of the uropod exopod and endopod are half as long as the outer setae in new species; in the type species, they are short, one-third or less the length of the outer setae and 22) the two dorsal plumose setae of the furcal rami differ in length in the new species but are of equal length in the type species.

As previously mentioned, the antennal organ is only present in some Asian species of the genera *Atopobathynella* and *Chilibathynella*, in addition to *Siambathynella*. In *Atopobathynella*, the antennal organ of *A. operculata* and *A. paraoperculata* from India consists of two massive lobes without setae or other structures (Ranga Reddy and Totakura 2015), whereas in *A. nelloreensis*, it is digitiform (Bandari, Shaik and Ranga Reddy 2017). In *Chilibathynella kotumsarensis*, the antennal organ is reduced and represented by two conical, dentate and nearly contiguous hyaline structures (Ranga Reddy 2006).

The two genera of Parabathynellidae known from caves in Thailand are easily distinguishable: species of *Siambathynella* present fewer articles, teeth, claws, setae and spines than those of *Paraeobathynella*. The three species of *Paraeobathynella* have between seven and nine AI articles; six to seven AII articles and a between three and nine exopod articles in all the thoracopods (Camacho et al. 2018). Also, a higher number of teeth, claws and spines on the different appendages is observed in *Paraeobathynella* than in *Siambathynella*.

The discovery of *Siambathynella janineana* sp. nov. adds one more piece to the puzzle of the diversification of genera and species, providing relevant information on the diversity of this group of crustaceans and the biodiversity of groundwater environments.

Ecology. The material of *Siambathynella janineana* sp. nov. studied was collected from a pool located in the upper gallery of Tham Chiang Dao Cave. In addition to these specimens, numerous others were sampled by Janine Gibert either by filtering another pool in the upper gallery using a plankton net with an 0.150 mm mesh [about

305 specimens (sp.) were collected with this method] or by using artificial substrates in the same pool (215 sp.) (Gibert 1987). A few specimens were also found in the terminal sump of the tourist gallery (1 sp.), at the outside emergence (1 sp.) and in a Bou-Rouch pump that was positioned about 25 m downstream of the emergence (40 cm depth and 20 l filtered) (1 sp.). The most abundant populations found in the cave were Bathynellacea, with a total of 523 specimens (Gibert 1987). Other taxa collected included mainly ostracods, a few cyclopoid copepods and rarely gastropods and harpacticoid copepods (Gibert 1987). The temperature of the sampled waters varied between 21 °C and 23 °C during July 1985.

Etymology. The species name "*janineana*" (adjective) is dedicated to Prof. Janine Gibert, who passed away in 2009. She was head of the Groundwater Hydrobiology and Ecology Laboratory (UMR CNRS 5023, Laboratoire d'Ecologie des Hydrosystèmes Fluviaux, Hydrobiologie et Ecologie Souterraines) at Université Claude Bernard Lyon 1 in France. She worked in various international programs on subterranean biodiversity and groundwater ecology from the perspective of environmental sustainability, particularly in the project "Protocols for the ASsessment and Conservation of Aquatic Life In the Subsurface (PASCALIS)". She was also a member of the biospeleological team that led Expedition Thai-Maros in 1985 and was highly active in the sampling of the caves, especially Tham Chiang Dao.

Nomenclatural statement. The life science identifier (LSID) number obtained for the new species is https://zoobank.org/F4366538-281F-40A4-92E5-6BAEE6D3E3E2

Distribution of Thai species of the family Parabathynellidae

Until 2011 (Camacho et al. 2011), the only genus of Parabathynellidae known in Thailand was the monotypic *Siambathynella*. Since then, three species of the genus *Paraeobathynella*, which was previously known only from Vietnam, have also been recorded in Thailand (Camacho et al. 2018). With these four species and the new one of *Siambathynella* described here, which was originally found in 1985, the number of known species of Parabathynellidae in Thailand increases to five. These species have been found in caves in both the northern (Nam Nao National Park, Phetchabun and Chiang Dao District) and southern (Nakhon Si Thammarat Province) regions of the country. Given the many unexplored or unsampled areas in Thailand, and generally in Asia and around the world, undoubtedly many new genera and species await discovery.

The distribution of the two genera present in Thailand, and the six species known in this country and Vietnam, is as follows:

Paraeobathynella Camacho, 2005

- *P. hanjavanitiana* Camacho & Watiroyram, 2018. Type locality: Khao Plu Cave, Khao Ro Subdistrict, Thung Song District, Nakhon Si Thammarat Province, Southern Thailand (coordinates: 09°14'22.00"N, 99°48'72.00"E – Z 56 m a.s.l.). Habitat: cave.

- *P. ratensis* Camacho & Watiroyram, 2018. Type locality: Rat Cave, Kapang Subdistrict, Thung Song District, Nakhon Si Thammarat Province, Southern Thailand (coordinates: 08°02'48.24"N, 99°43'42.48"E – Z 89 m a.s.l.). Habitat: cave.
- *P. siamensis* Camacho & Watiroyram, 2018. Type locality: Khao Krot Cave, Kuanthong Subdistrict, Khanom District, Nakhon Si Thammarat Province, Southern Thailand (coordinates: 08°01'22.50"N, 99°34'36.09"E – Z 45 m a.s.l.). Habitat: cave.
- *P. vietnamensis* Camacho, 2005. Type locality: Hang Trinh Nu, Bo Hon Island, Vinh Ha Long, Vietnam. Habitat: caves. Other localities: Trung Trang and Ang Vem caves, Cat Ba Island, west of Vinh Ha Long, Vietnam.

***Siambathynella* Camacho, Watiroyram & Brancelj, 2011**

- *S. janineana* sp. nov. Type locality: Tham Chiang Dao Cave, Amphoe Chiang Dao, Chiang Mai Province, Chiang Dao District, Northern Thailand (coordinates: 19°23'38.44"N, 98°55'41".00E – Z 455 m a.s.l.). Habitat: cave.
- *S. laorsriae* Camacho, Watiroyram & Brancelj, 2011. Type locality: Tham Yai Nam Nao Cave, Nam Nao National Park, Phetchabun, Thailand (coordinates: 16°63'19.0"N, 101°51'57.9"E – Z 684 m a.s.l.) . Habitat: cave.

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